

Attorney Docket No. 88742.472005
(formerly TUEC.IP2005)
Customer No. 24347

AMENDMENT AND RESPONSE
TO OFFICE ACTION
SERIAL NO. 09/427,775

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IN THE CLAIMS

Claims 1-5, 7-17, 24-25, 27-50, 52-62, 64-88, 90-103, 105, 111-114, 117-129, and 132 were pending in this Application prior to this Amendment and Response. Please ~~cancel~~ Claims 69, 83 and 84, without prejudice or disclaimer, and amend Claims 1, 2, 3, 7, 13, 14, 27, 52, 54, 64, 65, 66, 102, 118, 119, 120, 121, 122, 123, 125 and 129 as provided below. Please note that Exhibit B provides an edited version of the amended Claims, and highlights all such amendments. Thus, Claims 1-5, 7-17, 24-25, 27-50, 52-62, 64-68, 70-82, 85-88, 90-103, 105, 111-114, 117-129, and 132 are now pending in this Application.

1. **(Three Times Amended)** A method for plasma plating comprising:

positioning a substrate with a threaded surface within a vacuum chamber;

positioning a depositant in an evaporation source within the vacuum chamber, the depositant includes at least a first metal;

reducing an initial pressure in the vacuum chamber to at or below 4 milliTorr;

flowing a gas through the vacuum chamber at a rate to raise the pressure in the vacuum chamber to at or between 0.1 milliTorr and 4 milliTorr;

applying a negative dc signal to the substrate at a voltage amplitude at or between 1 volt and 5000 volts;

applying a radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts; and

heating the depositant to a temperature at or above the melting point of the depositant, whereby a plasma is generated in the vacuum chamber, the plasma includes a mixture of positively charged depositant ions and negatively charged electrons, and the depositant ions are plated on the threaded surface of the substrate to

create a plated threaded surface, and wherein the plated threaded surface reduces galling between the plated threaded surface and a surface of a mated component.

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concl*
2. **(Twice Amended)** The method of Claim 1, wherein the initial pressure is reduced in the vacuum chamber to at or below 1.5 milliTorr, and wherein gas is flowed through the vacuum chamber at a rate to raise the pressure in the vacuum chamber to at or between 0.5 milliTorr and 1.5 milliTorr.

3. **(Twice Amended)** The method of Claim 1, wherein the negative dc signal is applied to the substrate at a voltage amplitude at or between negative 500 volts and negative 750 volts.

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7. **(Twice Amended)** The method of Claim 1, wherein the initial pressure is reduced in the vacuum chamber to at or below 1.5 milliTorr, and the gas is flowed through the vacuum chamber at a rate to raise the pressure in the vacuum chamber to at or between 0.5 milliTorr and 1.5 milliTorr, wherein a negative dc signal is applied to the substrate at a voltage amplitude at or

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between negative 500 volts and negative 750 volts, and wherein
the power level is provided at or between 5 and 15 watts.

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13. **(Amended)** The method of Claim 12, wherein the dc
signal and the radio frequency signal are applied to the
electrically conductive material of the turntable using a
commutator.

14. **(Amended)** The method of Claim 12, wherein the dc
signal and the radio frequency signal are applied to the
electrically conductive material of the turntable using an
electrically conductive brush.

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27. **(Amended)** The method of Claim 1, further comprising:
mixing the dc signal and the radio frequency signal to
generate a mixed signal, and wherein the dc signal and
the radio frequency signal includes applying the mixed
signal to the substrate.

52. **(Three Times Amended)** The method of Claim 1, further comprising:

positioning a second depositant in a second evaporation

source within the vacuum chamber before reducing the

initial pressure in the vacuum chamber to at or below

4 milliTorr; and

heating the second depositant to at or above the melting

point of the second depositant, whereby a second

plasma is generated in the vacuum chamber, the second

plasma includes a mixture of positively charged second

depositant ions and negatively charged electrons, and

the second depositant ions are plated on the threaded

surface of the substrate.

me 54. **(Three Times Amended)** The method of Claim 52, further comprising:

Sub D> positioning a third depositant in a third evaporation source within the vacuum chamber before reducing the initial pressure in the vacuum chamber to at or below 4 milliTorr; and

heating the third depositant to a temperature at or above the melting point of the third depositant, whereby a third plasma is generated in the vacuum chamber, the third plasma includes a mixture of positively charged third depositant ions and negatively charged electrons, and the third depositant ions are plated on the substrate.

C17 64. **(Amended)** The method of Claim 62, wherein cleaning the substrate includes cleaning the substrate to meet a defined standard defined by Steel Structures Painting Council (SSPC).

65. **(Amended)** The method of Claim 64, wherein the standard is SSPC-5.

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66. (**Amended**) The method of Claim 64, wherein the
standard is SSPC-10.

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69. (**Cancel**) The method of Claim 1, wherein the
depositant is a metal.

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83. (**Cancel**) The method of Claim 1, wherein the
depositant is a nonmetal

84. (**Cancel**) The method of Claim 1, wherein the
depositant is a ceramic.

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102. (**Twice Amended**) The method of Claim 1, wherein the
gas is argon and the depositant is a metal alloy of
silver/palladium, and the plasma includes argon ions and
silver/palladium ions.

118. **(Amended)** The method of Claim 1, wherein the plasma forms a layer on the substrate to create the plated threaded surface at a thickness at or between 500 and 20,000 Angstroms.

119. **(Amended)** The method of Claim 1, wherein the plasma forms a layer on the substrate to create the plated threaded surface at a thickness at or between 3,000 and 10,000 Angstroms.

120. **(Amended)** The method of Claim 1, wherein the plasma forms a layer on the substrate to create the plated threaded surface that can be controlled to a thickness of 500 Angstroms.

121. **(Amended)** The method of Claim 1, further comprising:
backsputtering the substrate before heating the depositant
to a temperature at or above the melting point of the
depositant .

122. **(Twice Amended)** The method of Claim 1, further
comprising:
performing backsputtering before heating the depositant
that includes:

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reducing the pressure in the vacuum chamber to at or

below 100 milliTorr;

flowing a gas through the vacuum chamber at a rate to

raise the pressure in the vacuum chamber to at or

between 20 milliTorr and 100 milliTorr;

applying a dc signal to the substrate at a voltage

amplitude at or between 1 volt and 4000 volts;

and

applying a radio frequency signal to the substrate at

a power level at or between 1 watt and 50 watts.

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Amended

123. **(Twice Amended)** The method of Claim 122, wherein reducing the pressure in the vacuum chamber includes reducing the pressure in the vacuum chamber to at or below 50 milliTorr, and wherein flowing the gas through the vacuum chamber at a rate to raise the pressure in the vacuum chamber to at or between 20 milliTorr and 100 milliTorr includes flowing the gas through the vacuum chamber at a rate to raise the pressure to at or between 20 milliTorr and 50 milliTorr.

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125. **(Twice Amended)** The method of Claim 122, wherein applying the radio frequency signal to the substrate at a power level at or between 1 watt and 50 watts includes applying the radio frequency signal at a power level at or between 5 and 15 watts.

129. **(Three Times Amended)** A method for plasma plating
comprising:

positioning a substrate with a threaded surface within a
vacuum chamber;

positioning a depositant in the vacuum chamber;

reducing an initial pressure in the vacuum chamber to at or
between 0.5 milliTorr and 1.5 milliTorr;

applying a negative dc signal to the substrate at a voltage
amplitude at or between 500 volts and 750 volts;

applying a radio frequency signal to the substrate at a
power level at or between 1 watt and 50 watts; and

heating the depositant to a temperature at or above the
melting point of the depositant, whereby a plasma is
generated in the vacuum chamber, the plasma includes a
mixture of positively charged depositant ions and
negatively charged electrons, and the depositant ions
are plated on the threaded surface of the substrate to
create a plated threaded surface, and wherein the
plated threaded surface reduces galling between the
plated threaded surface and a surface of a mated
component.